DOCUMENT RESUME

ED 441 641 RC 022 440

AUTHOR	Howard, Peter
TITLE	Contextual Issues Related to Aboriginal Children's Mathematical Learning.
PUB DATE	1998-12-00
NOTE	16p.; Paper presented at the Annual Conference of the Australian Association for Research in Education (Adelaide, Australia, November 29-December 2, 1998).
AVAILABLE FROM	For full text: http://www.swin.edu.au/aare/.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Culture Conflict; Disadvantaged; *Educational Attitudes; *Educational Environment; *Elementary School Students; Foreign Countries; *Indigenous Populations; Intermediate Grades; Mathematics Education; Minority Group Children; Parent Attitudes; Racial Bias; *Student Attitudes; *Teacher Attitudes
IDENTIFIERS	Australia

ABSTRACT

This paper focuses on contextual issues arising during an ethnographic study of mathematics instruction for Aboriginal children in New South Wales, Australia. Conversational interviews with Aboriginal children in grades 5-6, Aboriginal parents, and Aboriginal and non-Aboriginal teachers and staff identified context as 1 of 17 core categories of beliefs related to the learning and teaching of mathematics. Aboriginal parents and Aboriginal educators were well aware of contextual influences on the learning of Aboriginal children, and they commented on such issues as institutional racism, the great differences between school and community environments, language differences, the low expectations of non-Aboriginal teachers for Aboriginal children, the lack of employment in Aboriginal communities, discipline policies, and the poor relationships between school and many Aboriginal parents. Non-Aboriginal teachers focused on the Aboriginal child in school, home-school differences, and the teacher's role. Tables summarize the comments of Aboriginal students, parents, and educators and non-Aboriginal teachers in the following subcategories: Aboriginal children and school, racism and discrimination, community, discipline and student behavior, Aboriginal parents, expectations, teacher's role, and language. Sample comments are included. (Contains 12 references.) (SV)

Reproductions supplied by EDRS are the best that can be made
from the original document.

AUSTRALIAN ASSOCIATION FOR RESEARCH IN EDUCATION

Contextual issues related to Aboriginal children's mathematical learning

PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY
Peter Howard

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)"

ED 441 641

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Peter Howard

Australian Catholic University

This paper draws on aspects of an ethnographic study undertaken in a rural community in New South Wales which investigated the expressed beliefs of Aboriginal children, Aboriginal educators, Aboriginal parents and non-Aboriginal teachers towards the learning and teaching of mathematics in the last two years of primary schooling. Conversational interviews were used to collect the data. The data analysis identified seventeen core categories of beliefs across the participant comments. Participant belief statements for each of the core categories were further analysed into sub-categories.

The aim of this presentation is to focus on the expressed beliefs of the participants related to the core category of Context and the related sub-categories: Aboriginal children and school, racism and discrimination, community, discipline and behaviour, Aboriginal parents, expectations teacher's role and language. Significant implications for the classroom and recommendations for initial teacher education and teacher professional development to enhance Aboriginal children's mathematical learning are discussed.

Introduction

In the past, the mathematics curriculum has focused on "values and concerns which are more middle class than working class, and .... on experiences which are more relevant to children of Anglo-Celtic descent than those of Aboriginal descent or those from non-English speaking backgrounds" (AEC 1991, p. 9). Students should experience mathematics in the multicultural context of Australian society through an understanding of the variety of mathematical ideas that come from different cultures. Mathematics learning should build on students' strengths and mathematics educators "should avoid interpretations of 'ability' or 'intelligence' based on culturally narrow interpretations of important knowledge" (AEC 1991, p. 9). Thus the diversity of students' backgrounds should be recognised in the mathematical activities which are offered.

The particular case of rural and urban Aboriginal learners has been recognised in A National Statement on Mathematics for Australian Schools.

> *"There has been considerable research into mathematics in traditional Aboriginal communities and this has had some influence on the teaching of mathematics in these communities. Most Aboriginal Australians, however, live in rural and urban areas, but there is little research available on the linguistic and cultural influences on their learning of mathematics" (AEC 1991, p. 9).*

Most investigations of Aboriginal people and the learning of mathematics have focused on geographically remote communities (Harris, 1991; Harris, 1990; Currie, Kissane & Kemp, 1989). However, factors such as a content driven mathematics curriculum, teacher explanations, the language used in the learning of mathematics, identity, the lack of content relevance for students, inconsistent use of concrete materials and the need for teacher sen vity (French, French, Matthews, Stephens & Howard, 1994; Harris & Malin, 1994; Howard, 1998) are some of the contextual issues impacting upon Aboriginal children's school based mathematical learning.

RC022440

BEST COPY AVAILABLE

Methodology

The purpose of this ethnographic study was to investigate the held views of Aboriginal students, Aboriginal parents, Aboriginal educators and teachers towards the learning of mathematics in Years 5 and 6. Throughout the study there was continuing negotiation and consultation between the researcher and the various school and community Aboriginal and non-Aboriginal groups who were involved (Cutmore & Howard, 1995). These included state and regional Aboriginal Education Consultative Groups, Aboriginal Education Assistants, ASSPA Committees, Parent and Citizen Associations, school staffs, New South Wales Department of School Education and individual teachers, parents and students. At this point the willingness, co-operation and trust of all those groups involved with the study has to be acknowledged.

Conversational interviews (Spradley, 1979) were considered to be the most appropriate method for data collection as they enable participants to express their views in a way that surveys often do not allow. All participants were informed that their ideas would be shared with others and that pseudonyms would be used to maintain confidentiality. Interviews were transcribed and data analysis undertaken to develop categories for reporting the data. The time spent living in the community by the researcher and the researcher's ten year connection with the community lessens the possibility of bias within the development of the categories though it is still acknowledged that these findings are indicative of the participants views and may not be generalised across all students (Miles & Huberman, 1994).

Data Analysis

The core categories for the analysis of the data evolved from the interviews and the principles for school mathematics as stated in A National Statement on Mathematics for Australian Schools (AEC 1991, p. 4-24). The statement provides a relevant framework within which discussion and recommendations can be presented. The interviews were analysed using related grounded theory with the researcher using a constant comparative approach (Glaser & Strauss, 1967) to identify core categories which represent major influences in the learning and teaching of mathematics. Seventeen core categories emerged from the analysis. Fourteen core categories derived from the national statement and 3 - People, Homework, Family Concern - generated from the interview comments:

Feelings;	People;	Language;
Context;	Relevance;	Homework;
Materials;	Learning;	Teaching;
Structures;	Technology;	Assessment;
Problem Solving;	Family Concerns;	Teacher/parent development;
Content;	Other.	

This paper focuses on the core category Context defined and contextualised as follows.

Context identifies issues related to the social, cultural, economic, historical and political contexts in which the learning of mathematics takes place.

A dimensionalisation of the core category identified a number of sub-categories [Aboriginal children and school, racism and discrimination, community, discipline and behaviour, Aboriginal parents, expectations teacher's role and language] into which the participant's belief statements were further analysed.

Results

Children - Aboriginal Girls

The girls identified a range of contextual issues which affect students learning of mathematics. Cassie believed that Aboriginal children found it hard to do mathematics but she did not know why. Susan thought that if Aboriginal students were "brainy" they would find mathematics easy. In fact she had decided how one could determine if a student was brainy.

*SUSAN: Like they get all the answers right all the time in maths. That's how I think they're brainy. Cause they know all the answers and when they hand up a maths book they get them all right, like my friend. Her mother went to College or Uni and she's real brainy and her daughter is real brainy too. She is like her mother.

Sam and Tina were positive that some Aboriginal students find mathematics hard and they suggested one way teachers could help.

*SAM: Get us to all sit around and have a good talk like we're talking to you now about mathematics. Instead of just giving out sheets all the time. She wouldn't even know how to work it out. She had to add it up on the calculator.
*I: Is this a student?
*SAM: No our teacher. She should know. She's learning us.

Sam and Tina attended school regularly. They expressed their views on the contexts in which other children found themselves and suggested what should be done to improve their attendance.

*I: You two come to school a fair bit.
*SAM: Nearly everyday. I love it cause I'm here with my friends and learning about things. Growing up to get an education not just like some people drunk and smoking all the time. I saw one of the kids in my class up drunk the other night smoking yanni [marijuana]. She can't even spell. They should force her to be in this here school.
*I: How would they do that?
*TINA: Get the welfare to go down there.
*SAM: Why shouldn't the HSLO go down there? That's the job now ain't it? Someone's got to protect kids and that.

The students were very aware of the contextual impact of the teacher, school, family and community issues which affected students' learning of mathematics.

Aboriginal Boys

The boys commented little on contextual issues in which mathematics is learnt. Dennis liked doing mathematics outside because "it gets too hot and stuffy in class." Darryl, on the other hand, preferred to do mathematics inside:

*DARRYL: Just say the teacher wrote something on the board and you have to and you're outside and you have to stay in that one spot. Now how are you going to see what's on the board?

Brian liked to work outside "cause it's a lot different than being inside. You get to sit on the ground not seats. You get to do other things than times and stencils."

Aboriginal Parents

One parent, Dawn, spoke directly about many of the issues related to the context in which children learn. She believed in the importance of parent involvement but identified many reasons why it was not happening. She talked about the two significant issues of discipline and institutional racism and their impact upon the learning of Aboriginal children.

Comment was made about the issue of there being no age limit in the activities of Aboriginal families yet at school there were artificial age barriers between children as they progressed through the different grades. This is not the case in many Aboriginal families. At times, this age barrier can affect children as it highlights a conflict between the community structure and that of the schools.

> * SALLY: There's no age limit in a lot of the things that kids do. They're not limited by age in joining in community activities. Thus it becomes hard for some of them when kids go on excursions. How come they go away and I don't go? Aboriginal people have a community life where often everyone goes away together. When they don't kids can't understand. There's often a different structure in the community to that within schools.

- The issues of institutional racism and family factors were seen by Dawn to influence Aboriginal children's learning. She believed that many teachers were not even aware of the institutional racism which existed. Dawn also believed that the more assimilated you appeared to be the more accepted you were.

> *DAWN: The more assimilated you are the more accepted you are. So you be a good little Jackie you're reliable and prompt and all those things which are requirements of the hidden curriculum.

The issue of discipline leading to detentions was a focus of part of the interview.

> *DAWN: A parent from one school pulled her kids out of a school because there was a query about the welfare of the children. She wasn't going to put up with that interrogation. If a kid does get to school late they're made to sit outside the classroom for a couple of periods. How is that important to education? Like these detention periods. My child isn't getting educated, they're getting disciplined. The discipline is becoming more important than the education. We'll punish this kid because he mucked up. We'll sit him outside. That's an old punishment strategy.

Dawn believed that from a school point of view Aboriginal student behaviour was the major concern. This was not a shared view of the community.

> *DAWN: .... their view would be cultural awareness or racism whereas the school would say behavioural problems. They're picking on our kids.

Dawn felt that a greater degree of communication between schools and the community would assist in developing more appropriate contexts for enhancing children's' learning.

> *DAWN: Schools should have a workshop between teachers and parents and look at the discipline policy. A teacher could suspend a student thinking that they are swearing when using an Aboriginal name for them. They need to look at negotiating punishments for types of behaviour and what is acceptable for the parents. A lot don't know this sort of thing is going on. The

teachers get all that in theory but role playing it and putting those skills into practice is something else.

Dawn was of the view that many of the schools focused on literacy with not the same degree of interest and funding going towards numeracy. There would seem to be the view that for many Aboriginal parents there still exists significant conflict between school and parents. Relatively few Aboriginal parents are involved in schools. Dawn believed that schools "need to have strategies to actually get more parents involved in making decisions in the school." She singled out apathy of Aboriginal people as one reason why more parents and more of the community were not involving themselves in schools.

*DAWN: I think there's a lot of apathy and a lot of families are caught up with their own problems, like very little commitment. There's awareness of education, their own experiences their own problems and their lack of wanting to get involved. I think with that apathy, that is one of the things stopping development in Aboriginal communities across Australia I reckon. They expect someone else to do it. They're not willing to volunteer their time to help out.

Aboriginal Educators

The Aboriginal educators emphasised the context in which Aboriginal children learn mathematics. The AEA's identified several cultural factors that influenced children's learning. Carmel believed that Aboriginal children did not achieve to their potential in mathematics because the children saw mathematics as boring. However, Carol and Tracey believed it was far more complicated. They saw two systems of learning going on in the school and mathematics classroom. The white system, that children have to get used to, and the Aboriginal system within which they live and learn. Carol believed that at times Aboriginal students have to learn to talk differently to the way they talk at home. Students have to think in two different systems.

*TRACEY: Because you'll get pulled up all the time. Especially in a white man's system you have to think.
*CAROL: You're aware of it aren't you.
*TRACEY: You're shamed.

Carol suggested that when children want to ask questions they do not think about how to phrase the questions in white terms because they do not know the white language system. Then they get picked up on how they ask the question, not what they want to know. Tracey believed many of the teachers "just don't understand where the kids are coming from." She also believed that " education was never part of our life until it was forced upon it ."

*TRACEY: We survived without that in our own way. I won't say you. I won't point at you. I'll say if they lived under how we was, what we had to come up through you'll survive anything.

Phil and Sandy acknowledged that the influence of being Aboriginal affected children's learning.

*PHIL: Different cultures have different ways of saying that kids have to learn this way and that way and with Aboriginal culture I think the most important thing is hands on stuff. Kids learn better I reckon that way.
*SANDY: Yeah.
*PHIL: It just seems clearer to them than all this writing on the board and you know teacher expressions and big long words.

The values that affect Aboriginal behaviour were often reflected in students' attendance at school. Aboriginal people value their right not to listen to you. Half way through a meeting someone may stand and walk out. They are not being rude they just do not want to listen anymore. Crystal suggested that this is what Aboriginal children may do at school. She believed it was not right, but placed the dilemma in the context of being Aboriginal.

*CRYSTAL: But it's not all right that they don't come to school.
*I: In their eyes it may well be.
*CRYSTAL: Possibly. I think when so much damage has been done to our culture over two hundred years. What people don't realise is that our culture was so different before anyone else was here. I guess I'm in two cultures. Sometimes I don't know where I belong. Our kids are disadvantaged because they are not learning and I can see that we're still going to be the workforce.

The reality is that everything points towards all Aboriginal classes. We have to do something to get our kids educated. When I came from the Mission I was one of two that went right through to Year 10 because the others couldn't cope. They got sick of the racism and the teachers and all that stuff.

Crystal believed that Aboriginal children as young as ten and eleven identified that life was different for them.

*CRYSTAL: I think that they are more aware that they are black and that there are differences cause that's when I started to realise that I was different and that people treated you differently because you weren't the same colour and the opportunities just aren't there. It's a real issue. That's what happens.

Many Aboriginal children live in situations where they witness a lot of unemployment. This context can affect how children come to school and they reach a stage of, "What's the point learning at school?"

*CRYSTAL: I suppose in some circumstances yes. If they've never seen their parents in a job. I mean to be real the jobs that you get are Aboriginal money anyway. You seldom get chosen on your merit. All the jobs I've had was Aboriginal money. I suppose they get to the stage of what's the point.

School and families have to work together. The Aboriginal educators find it difficult to get Aboriginal parents involved in the school. Many schools are bicultural with a huge range of parental socio-economic backgrounds. Crystal had begun a university course and she felt that she was seen now to have changed. The white fellas treated her and viewed her as being different to other Aboriginal people.

*CRYSTAL: They see us as different. We're white because you want to be educated. You leave them because you're educated and you want to live differently to them. It's all these things. It all comes into play and it's all these little things that happen and you can see it. When I first went to uni I hated it because when I came home people treated me differently. My set of friends now are not the ones I used to have. I think it's like when they took the kids away. If you educate their kids you're taking them away. That's a fear that I find with Aboriginal people.
*I: So it's not moving kids from one place to another but with education they separate themselves from others?

*CRYSTAL: Perhaps. I think that's a main thing. It changes their kids from talking the way they do at home. The kids come back different.

Continually, as Aboriginal children attend school and become educated they have to keep asking, "Who am I?" The role of school and its effect on changing Aboriginal children was a critical issue for Crystal.

*I: Are the schools still trying to make white kids out of black kids?

*CRYSTAL: Of course they are and you tell anyone that and they'll say I'm not, I'm not.

*I: To succeed in some schools if you're Aboriginal you have to be more white than black?

*CRYSTAL: Yes. That means that you have to turn your back on your own people in schools.

*I: Some people would say that you have to do that to succeed. Yet you have to maintain who you are.

*CRYSTAL: Suppose our kids got educated. Who would employ them? I think of the hundred per cent of Aboriginal people in town. You're lucky if ten per cent work and all the jobs that are funded are Aboriginal money. Aboriginal people have been employed for only thirty years. That's not a long time. ..... If our kids go through and want to be educated they have to see at the end that there is a job. We have Aboriginal teachers who have to go into other things to find employment. We're the minority who aren't getting educated. We're the real problem in Australia.

Crystal was annoyed that many of the intervention programs for Aboriginal children are taught by non-Aboriginal teachers. She believed that "some teachers aren't committed to them and the kids know that." Crystal believed that most Aboriginal parents want their children to learn and that the myth that they don't needs to be put away. Moreover, " the present situation is not working for the majority of Aboriginal kids." She believed that " often the teachers don't have the knowledge or the experience" to work with Aboriginal communities and Aboriginal students. Many have limited expectations of the potential of Aboriginal students.

*CRYSTAL: Nobody expects Aboriginal kids to be anybody. They expect them to be on the dole and stay that way. Kids live up to what's expected of them.

Crystal believed that the parents, children, the school and other parts of the community all had there expectations for Aboriginal children learning at school and that across these groups there were similarities and differences. Parents were concerned for what their children were learning at school. Crystal knew that there was "a difference between what's real and what the community sees as important. I send my kids to school but are they going to learn what they need to learn. I mean, we have illiterate kids at fifteen who have been through the school system."

Michele discussed recognition for Aboriginal children and their achievements which lead to issues of self esteem, parental involvement and suspension. She finished by highlighting the need for teachers to visit the homes of the children they taught just to understand from where the children were coming.

*MICHELE: A lot of the parents when they have to come in just won't come. Usually I'll go out and see them and take the stuff to them and talk to them. I've been trying to get some teachers to come but I'm not having much luck. Nof many will go out.

> They have to go to the top camp and Mission. They have to realise that's how the kids live because when I tell them here how the kids are living at home they get shocked. They say that can't be right. They have to go out and see for themselves. They might get shocked to see some of the houses and whatever but so what. Then they might understand some of the kid's problems when they come to school.

When Aboriginal children were placed on suspension Michele often got upset. "I say I wish you had of come to me first and maybe we could have sorted the problem out before we got to suspension. Something might have happened at home at night and you don't know anything about it." There appeared to be an increase in school suspensions with no apparent reasons. Michele talked of the need for teacher awareness and sensitisation to the issues facing parents and Aboriginal children. She also believed the issue of body language was important for Aboriginal children and that "Murri kids seem to learn it right from the start of when they come into school. Some Murri kids from pre-school seem to know a lot more when they come into primary, I don't know." The issues of language and the two worlds that Aboriginal children live in became a theme in the interview.

> *MICHELE: I often talk to them about the language with them here. I say we have to change. We're living in two worlds. At home we can speak the way we always speak but the minute you come to school they expect you to change and speak the proper way. Sometimes I forget myself and speak just as I would speak at home. They should be told all this type of stuff.

There are children who come to a school as new arrivals and the issues that they bring with them can affect their learning. Sally believed that it was sometimes the little things that put children off, "Do you know my kid was stood up and told that they weren't in school uniform. Then they expect them to go and learn maths after they've just been rubbished." Michele agreed.

> *MICHELE: Exactly. That's a big thing here when they come in new. I know that schools want them to be neat and tidy but I say how's that going to affect student's learning. But that's the policy and I say but they come from a place that's got no money at the moment.

Michele believed that the teachers should come to the AEA's more often because the Aboriginal educators know a lot about the Aboriginal children, the community and strategies to help Aboriginal children learn at school. However, "there's only a couple who'll come to me and it's only when they're in lots of trouble with a kid. I think they should be using us more."

Teachers

Much of the teacher comments focused on the cross cultural context of learning mathematics and the complexity of life that many Aboriginal children experience. The differences between school and home life, the life style of many Aboriginal children and the degree of teacher awareness of the history and lives of many Aboriginal children were elements raised by teachers as they tried to enunciate their views about the influence of context on Aboriginal children's learning in mathematics. There was genuine concern in trying to identify why many Aboriginal children were not meeting their potential in mathematics and why they did not perform to teacher expectations when they undertook mathematics tests. Some of the teachers believed that Aboriginal children could do better than their mathematics test results indicated.

BEST COPY AVAILABLE

Mr Kennedy talked about the context in which he was teaching and how different it was from teaching the top mathematics class last year to a lower class this year.

*Mr KENNEDY: A lot of the kids see school life as a separate entity to home life. At three o'clock they forget school until they have to come back tomorrow morning. But there are some who don't.

He believed that the achievement levels of the Murri students had "a lot to do from the very start of school. What they know then and what the teacher has to build on." He thought that the home did not value a lot of what was needed for school. He viewed the school as being a place where children's knowledge was built upon. He used the metaphor of a brick wall being laid.

*Mr KENNEDY: By the time they get to Year 5 if you're making a wall you really need a lot of bricks on the bottom. At least there's a footing to keep it up. In Kinder, first and second you have to concentrate on building that first row of bricks so by the time they get to Year 3 the wall should be half built and they try to give them those bricks but they don't have anything to rest on. It's just a vicious circle and it gets more vicious the older the kids get. What they need is to go back to second class and learn some of the stuff down there and slowly work up that way. So by the time they're in Year 6 they're at Year 4 level rather than being at a Year 2 level because they haven't understood anything for the last year or two because it's just been above them.

I asked Mrs Allan why there was only one Murri student in the top mathematics class. She explained her views referring to Natalie, an Aboriginal student in the second mathematics class.

*Mrs ALLAN: I don't know. That's one of the reasons I don't like streamed classes. I've been here twenty years and it was streamed and I had enough trouble with the B class. I thought it was terribly unfair. You don't get many Aboriginal kids in the top class. Natalie is a great steady worker. I give her a test she doesn't fail but she doesn't shine out. I'd expect her to do better because she always appears confident with her work. She participates well. There's a lot of that self fulfilling prophecy where people expect people to perform certain ways. Perhaps you frame things so it works out how you expect it to work out. It could be so subtle that you don't even know it's happening. You can't come to school assuming things are going to happen and it does. Then you start picking. A lot of kids should be doing better and I don't know if it's an attitude or they're not getting support from home. I don't know much about their history.

Mrs Allan was sure that the home life of some of the Aboriginal children would be beyond the endurance of many teachers.

*Mrs ALLAN: I'm sure if we knew how some of these kids lived I don't know if I could take it. You want to make them feel safe and happy here cause I think that's the most important thing with kids in your class. You have to be happy, number one. If they're happy they'll work to the best of their ability, if they're not you're not going to get much out of them. They have to be happy and have an approachable teacher who will listen to them.

Mrs Allan went on to talk about issues of cross cultural learning that she perceived.

*Mrs ALLAN: They talk about different learning styles for Aboriginal children. I don't know sometimes if I'm catering for them because a lot of Aboriginal children don't appear to go well with maths. Sometimes you wonder why? Then you get a good kid and you think this person is special and you shouldn't have to think of that. Then you have other kids who perform well in class and you put a test in front of them and they just do poorly. I don't know why. If I sat down with them they would be able to do it. I don't know if it's the concentration, they have to sit still or what it is. It doesn't matter what you use test, quiz, review I've used all those terms. Confidence too, they might think I'm not going to do too well so I don't try.

Beliefs

Participant comments were analysed and collated across the following sub categories.

	Aboriginal children and school
Aboriginal girls	some children are physically affected by too much noise in their mathematics class; children are smart at mathematics when they get all the answers right all the time.
Aboriginal educators	children's reputations, at school, tend to go with them from year to year; Aboriginal children should come to school; Aboriginal children in Years 5 and 6 are becoming more aware that they are black than when they were younger and they realise that they are different from their non-Aboriginal peers; Aboriginal children in Years 5 and 6 start to realise that they are limited by the opportunities available to them; the majority of Aboriginal children are not being well served in schools; schools are still trying to make white people out of Aboriginal children; to succeed at school Aboriginal children may have to turn their backs on their own people; Aboriginal children know that some teachers are not committed to them; Aboriginal children are often not recognised for their achievements at school; Aboriginal children are more sporty than academic.
Teachers	many Aboriginal children should be achieving at a higher level than they are at school; some Aboriginal children think that they are not going to do well in tests so do not try; many Aboriginal children cannot achieve to their potential because they commence school with an underdeveloped set of skills and knowledge; a lot of the work that Aboriginal children do in the early years of school is beyond them; children have to have a teacher who will listen to them; if Aboriginal children are happy they will work to their potential; school life is seen by many Aboriginal children as separate from home life; children who are good at school have a supportive home life; some things valued at school are not valued in some Aboriginal homes.

Table 1 Aboriginal Children and School

	Racism and discrimination
Aboriginal parents	racism, in schools, is more subtle now than what it use to be; many teachers are not aware of institutional racism within schools and that Aboriginal children suffer racism and discrimination; children's reputations, at school, tend to go with them; Aboriginal children are being victimised in some schools; people are judged on the basis that they are Aboriginal rather than for their own worth; the more assimilated Aboriginal people are, the more they are accepted by non-Aboriginal people.

Table 2 Racism and discrimination

	Community
Aboriginal parents	there is often a different structure in the community to that within schools; there is an artificial barrier of age at school; Aboriginal children are not limited by age when they join in community activities.
Aboriginal Educators	there are two systems, the white system and the Aboriginal system that Aboriginal people have to learn; Aboriginal people have to learn to talk differently in the two systems; Aboriginal people are aware of the two systems and that Aboriginal people live in two cultures; sometimes Aboriginal people do not know where they belong ; Aboriginal people have to keep seeking who they are; Aboriginal people are a minority who are not getting educated; Aboriginal people change when they seek education.

Table 3 Community

	Discipline and Behaviour
Aboriginal parents	discipline and behaviour issues amongst Aboriginal children are of major concern to teachers; teachers and parents need to talk through discipline practices together; there are inconsistent school practices in relation to discipline.; detention is about disciplining children not educating them; children do not learn when they are put on detention; discipline is becoming more important than education.

Table 4 Discipline and Behaviour

	Aboriginal parents
Aboriginal parents	will not put up with interrogation by the teachers; there is a lot of apathy amongst Aboriginal parents to becoming involved in schools; leaving school early stopped many Aboriginal parents from learning mathematics.
Aboriginal Educators	a myth exists that Aboriginal parents are disinterested in children; many Aboriginal parents will not come to the school; Aboriginal parents support sport more than academic pursuits; Aboriginal parents are not aware that there is a problem in mathematics because no one has told them; some Aboriginal parents fear the mobility that their children may have if they are successful at school.

Table 5 Aboriginal Parents

	Expectations
Aboriginal educators	Aboriginal children have to see that there is employment at the end of education; there are at least four sets of *expectations* for the learning of Aboriginal children: parental, children's, school and community; few non-Aboriginal people expect Aboriginal children to amount to anything; children live up to what is expected of them.

Table 6 Expectations

	Teacher's Role
Aboriginal girls	some teachers are not good at being able to do mathematics themselves; teachers should know the mathematics they are teaching.
Aboriginal educators	many teachers do try to meet the needs of the children; few teachers come to Aboriginal Educators seeking advice; teachers should seek advice from Aboriginal educators about Aboriginal children before the child is put on suspension; many teachers will not go to where Aboriginal parents live; many teachers are shocked when they are told how some Aboriginal children are living; if teachers see where some children live they would appreciate the children's problems more; often, teachers do not have the experience or the knowledge to teach Aboriginal children; teachers need sensitisation courses about Aboriginal educational issues.
Teachers	some teachers may teach in ways that favour non-Aboriginal children; teachers may teach favouring non-Aboriginal children in ways that are so subtle that they do not even know that it is happening; teachers do not know why some Aboriginal children know the work but do not perform to their ability in tests; teachers do not know much about Aboriginal history; many teachers would not be able to cope with knowing how some Aboriginal children live.

Table 7 Teacher's Role

	Language
Aboriginal Educators	Aboriginal children need to be told that they have to speak differently at school to the way they speak at home; children have to speak a different *language* at school; teachers expect Aboriginal children to speak a different way at school to home; Aboriginal children often get picked up on how they ask a question rather than what they want to know; Aboriginal children are corrected at school when they do not use the white language.

Table 8 Language

Discussion and Classroom Implications

The Aboriginal parents and Aboriginal educators were well aware of contextual issues influencing the learning of Aboriginal children. The teachers focused their comments on the Aboriginal child at school and their teaching role. The Aboriginal girls

were a little more forthcoming than the Aboriginal boys though neither group had probably any previous opportunity to consider and discuss amongst themselves contextual factors affecting their learning.

Teachers believed that many Aboriginal children should be achieving better at school than they currently are. They believed that this occurred because Aboriginal children start school with an underdeveloped set of skills and knowledge and that much of the work of the early school years is beyond them. The teachers' view was that Aboriginal children saw school as separate to home life. Aboriginal educators believed that Aboriginal children should come to school. They believed that children know that some teachers are not committed to them and that the majority of Aboriginal children are not being served well schools. Aboriginal educators expressed the belief that Year 5 and 6 Aboriginal children become more aware that they are black and realise that they are different from their non-Aboriginal peers. At this age Aboriginal children start to realise that they are limited by the opportunities available to them. For Aboriginal children, a critical learning time is in Year 5. Physical aspects such as classroom noise levels were identified by Aboriginal girls as impacting on their learning.

Aboriginal parents recognised that the age structure of schools created an artificial barrier that did not exist within Aboriginal communities. Whereas Aboriginal children mix in with activities in the community separation occurred at school. Within the mathematics classroom there are two systems of learning occurring and many Aboriginal children have to think in two different ways. Aboriginal children have to seek their identity in the mathematics classroom as in other learning contexts. Aboriginal children live, work and learn within two cultures and often they do not know where they belong. As a result of these contextual issues being identified, perhaps, the following question needs to be considered, *What does it mean to be an Aboriginal child learning mathematics ?*

Aboriginal educators clearly believed that racism and discrimination exist in schools in subtle ways. Teachers need to be aware of the institutional racism that occurs in schools. Also, many Aboriginal children they may have a perceived 'school reputation' which travels with them from year to year while others may be victimised in some schools.

Discipline and behaviour was seen by Aboriginal parents as a major concern of many teachers. For Aboriginal parents, effective discipline strategies have to be based on consistent school practices, the co-operative development of policies and an evaluation of the role of detention.

Apathy amongst Aboriginal parents regarding their involvement in schools does exist. However, it is a myth to believe that all Aboriginal parents were disinterested in the education of their children often they just have not been told of the mathematical difficulties being encountered by their children. Many Aboriginal parents felt intimidated by school based on previous personal experiences. Aboriginal parents need to be informed in ways which support their involvement in schools and the learning of their children.

Aboriginal children live up to what is expected of them and for Aboriginal children such expectations come from their parents, their own expectations, those of the school and those of the community. Further investigation is needed of the expectations from these four groups and how such expectations are expressed and explained to children. As is evident by the recent focus on raising expectations in NSW schools (DET, 1998) this is a significant issue for school communities generally.

Aboriginal girls believe that some teachers are not sufficiently knowledgeable at mathematics and they should be. Teachers may need to be upgraded in their mathematics teaching competency to meet children's expectations. Teachers believed that many of their peers do not appreciate Aboriginal history and were not aware of the factors influencing how some Aboriginal children live. They believed that teachers teach in ways which favour non-Aboriginal children and that this may occur totally subconsciously. This view suggested the need for some type of peer observation and evaluation of the teaching strategies used in the classroom.

Aboriginal educators were willing to provide advice to teachers and teachers need to seek this advice out. There has to be a greater appreciation for the knowledge and expertise of Aboriginal educators in providing advice to teachers and in informing teachers of situations in which Aboriginal children may be living which impacted upon their learning.

Not only do Aboriginal children have to speak a different language at school but teachers expect it of them. The children are often criticised by teachers for the way they speak rather than for what they have to say. Aboriginal children have to be told that they have to speak differently at school to the way they speak at home. For many Aboriginal children this dual language learning must be taken into account in the development of literacy programs, in the teacher's teaching and in teachers general interaction with children. The language that Aboriginal children bring with them to school needs to be valued and respected, the learning of the school based language needs to be appreciated and evident in the learning / teaching environment.

Conclusion

An obvious conclusion that can be drawn from the belief statements of the participants was the complex nature of issues related to the social, cultural, economic, historical and political contexts in which the learning of mathematics takes place. This may appear to be self evident however the extent to which such beliefs were espoused highlighted the need for teachers to both be aware and to seek out the views of Aboriginal children, parents, educators and to reflect on their own held beliefs. Beliefs have an impact on the learning and teaching of mathematics and the ways in which interactions within the school community are facilitated and evaluated. There are two systems of learning occurring in the mathematics classroom. Many Aboriginal children have to think in two different ways to achieve at school. The contexts in which Aboriginal children live and learn may result in many Aboriginal children not achieving to their potential. Contextual factors are critical in Aboriginal children's learning of mathematics.

References

Australian Education Council. (1991). *A national statement of mathematics for Australian schools*. Carlton, Victoria: Australian Education Council.

Currie, J., Kissane, B., & Kemp, M. (1989). *Mathematical achievement of Aboriginal students*. Perth: Murdoch University, School of Education.

Cutmore, B. & Howard, P. (1995). Identifying issues related to collaborative research in mathematics education with Aboriginal communities. In R. Hunting, G. Fitzsimmons, P. Clarkson & A. Bishop (Eds.). *Regional collaboration in mathematics education* (pp. 221 - 230). Melbourne: Monash University.

French, D., French, T., Matthews, S., Stephens, V., & Howard, P. (1994). Issues related to the learning of mathematics by Indigenous people. *Square One*, 4 (2), 10-17.

Glaser, B. G. & Strauss, A. L. (1967). *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine.

Harris, P. (1991). *Mathematics in a cultural context*. Geelong, Victoria: Deakin University Press.

Harris, S. (1990). *Two way Aboriginal schooling*. Canberra: Aboriginal Studies Press.

Harris, S., & Marlin, M. (Eds). (1994). *Aboriginal kids in urban classrooms*. Wentworth Falls, New South Wales: Social Sciences Press.

Howard, P. (1998). You have to learn me. *Australian Primary Mathematics Classroom*, 3 (4), 12 - 14.

Miles, M. B. & Huberman, A. M. (1994). *An expanded sourcebook: Qualitative data analysis*. Thousand Oaks, California: Sage Publications.

NSW Dpartment of Education and Training. (1998). *Raising expectations:achieving quality education for all [Consultative draft].* Sydney: Student Services & Equity Programs.

Spradley, J. (1979). *The ethnographic interview.* New York: Holt, Rinehart & Winston.